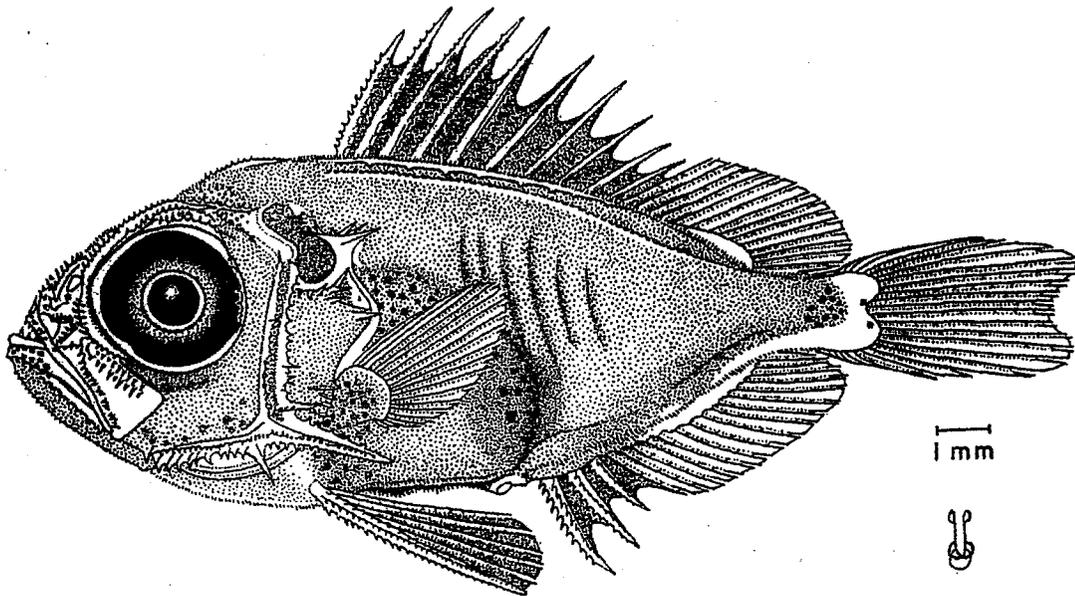




PRELIMINARY GUIDE TO THE IDENTIFICATION OF THE EARLY LIFE HISTORY STAGES OF
PRIACANTHID FISHES OF THE WESTERN CENTRAL ATLANTIC

BY

ALLYN B. POWELL



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516-9722

May 2000



PRELIMINARY GUIDE TO THE IDENTIFICATION OF THE EARLY LIFE HISTORY STAGES OF
PRIACANTHID FISHES OF THE WESTERN CENTRAL ATLANTIC

BY

ALLYN B. POWELL

U.S. DEPARTMENT OF COMMERCE
William M. Daley, Secretary

National Oceanic and Atmospheric Administration
D. James Baker, Under Secretary for Oceans and Atmosphere

National Marine Fisheries Service
Penelope D. Dalton, Assistant Administrator for Fisheries

May 2000

This Technical Memorandum series is used for documentation and timely communication of preliminary results, interim reports, or similar special-purpose information. Although the memoranda are not subject to complete formal review, editorial control, or detailed editing, they are expected to reflect sound professional work.

NOTICE

The National Marine Fisheries Service (NMFS) does not approve, recommend or endorse any proprietary product or material mentioned in this publication. No reference shall be made to NMFS or to this publication furnished by NMFS, in any advertising or sales promotion which would imply that NMFS approves, recommends, or endorses any proprietary product or proprietary material mentioned herein or which has as its purpose any intent to cause directly or indirectly the advertised product to be used or purchased because of this NMFS publication.

This report should be cited as follows:

Powell, A. B. 2000. Preliminary guide to the identification of the early life history stages of priacanthid fishes of the western central Atlantic. NOAA Technical Memorandum NMFS-SEFSC-437, 4 p.

W. J. Richards, Editor. NOAA Fisheries, 75 Virginia Beach Drive, Miami, FL

This report will be posted on the Bethune Cookman College NOAA Cooperative web site later in 2000 at URL: <http://208.152.233.21/NOAA/> and will also appear on the SEFSC web site at URL: <http://www.sefsc.noaa.gov/> It will be a chapter entitled Priacanthidae in the "Guide to the early life history stages of fishes of the western central Atlantic".

Copies may be obtained by writing:

The authors at
NOAA Fisheries
101 Pivers Island Road
Beaufort, NC 28516-9722

National Technical Information Center
5825 Port Royal Road
Springfield, VA 22161
(800) 553-6847 or (703) 605-6000
<<http://www.ntis.gov/numbers.htm>>

Priacanthidae: Bigeyes

A. B. Powell

The family Priacanthidae contains four genera and four species that occur in the western central North Atlantic (Starnes, 1988). *Pristigenys alta* is distributed in the Caribbean, Gulf of Mexico and along the east coast of North America. Although juveniles have been reported from as far north as southern New England waters, adults are not reported north of Cape Hatteras, NC. *Priacanthus arenatus* is distributed in tropical and tropically influenced areas of the western central North Atlantic in insular and continental shelf waters. Adult *P. arenatus* are distributed north to North Carolina and Bermuda, juveniles have been collected as far north as Nova Scotia. *Cookeolus japonicus* and *Heteropriacanthus cruentatus* are circumglobally distributed species and are both common in insular habitats. In the western central North Atlantic, *C. japonicus* ranges from New Jersey to Argentina; *H. cruentatus* from New Jersey and northern Gulf of Mexico to southern Brazil (Starnes, 1988).

Adult priacanthids are small to medium size fishes that are characterized by large eyes, which have a brilliant reflective layer, extremely rough scales and bright red live coloration. They are epibenthic predatory fishes that inhabit primarily rocky or coral habitats in depths from 5 to at least 400 m (Robins and Ray, 1986; Starnes, 1988).

Priacanthids in the western central North Atlantic appear to spawn in summer and fall; *P. alta*: late June-mid September; *C. japonicus*: May-September in the Caribbean; *H. cruentatus*: late spring-early summer in the Caribbean; and *P. arenatus*: fall in the Caribbean. Priacanthid eggs are pelagic, but egg size and size at hatching are unknown. Flexion occurs at 4-5 mm NL and the dorsal and anal rays are completed at approximately 7 mm SL. Larval priacanthids have a large head that has well developed spination consisting of a series of parallel serrated ridges on the dorsal surface of the frontals, and a large vaulted, serrated crest that is well developed in preflexion larvae soon after hatching. Other head spination includes serrate preopercle marginal spines, opercle, subopercle, interopercle, tabular, posttemporal, supracleithrum, lacrimal, circumorbital, nasal, dentary and branchiostegal spines. Spine lengths attain their greatest relative size during the preflexion stage and the diagnostic supraoccipital crest and spine disappears in the pelagic juvenile stage (approximately 30 mm TL). Priacanthid larvae are heavily pigmented in the head and gut region and with development on the lateral surfaces of the body. Priacanthids have a pelagic juvenile stage that is

usually barred and mottled and undergoes considerable change in appearance during settlement to their demersal habitat (Caldwell, 1962a,b; Johnson, 1984; Starnes, 1988; Watson, 1996).

Larval priacanthids are distinctive in both pigmentation and spination and are not likely to be confused with any other larvae in the western central North Atlantic. They may superficially resemble holocentrids or scombropids, which exhibit a supraoccipital crest and spine, but if confused they can be separated from these taxa by myomere counts (scombropids and holocentrids have 26 vertebrae, priacanthids have 23). Furthermore larval holocentrids attain a characteristic rostral spine that is apparent at approximately 2.8 mm TL (Keene and Tighe, 1984).

Descriptions of *Pristigenys alta* are available (Caldwell 1962a), but illustrations were probably developed from faded specimens and were not included here. The only larval priacanthids identified from North Carolina waters (from meristic characters) were *P. alta* (Powell and Robbins 1998). Although Powell and Robbins were unable to confirm the identification of larvae that had not developed meristic characters, it is likely that the small larvae were dominated by *P. alta*. Observations (A. B. Powell) indicate these larvae resemble *P. serrula* (Watson 1996). I have included illustrations of the four species, but it is not feasible to comment on specific identifications until size series become available for each (see Figure Priacanthidae 1).

Table Priacanthidae 1. Meristic characters for the priacanthid species that occur in the western central North Atlantic. All species have 10+13 vertebrae, 8+8 principal fin caudal rays, 1,5 pelvic fin rays, and 6 branchiostegal rays. Data are from Watson (1996), Caldwell (1962b) and Starnes (1988).

Species	Fin rays			
	Dorsal	Anal	Pectoral	Gill rakers
<i>Cookeolus japonicus</i>	X,13 (12-14)	III,13 (12-14)	18 (17-19)	5-8+17-20=23-27
<i>Heteropriacanthus cruentatus</i>	X,13 (12-13)	III,14 (13-14)	18 (18-19)	4-6+16-20=20-25
<i>Priacanthus arenatus</i>	X (XI),14 (13-15)	III,15 (14-16)	18 (17-19)	6-8+21-26=27-33
<i>Pristigenys alta</i>	X,11 (10-12)	III,10 (9-11)	17-18 (16-19)	6-9+17-21=23-30

Literature Cited

- Caldwell, D. K. 1962a. Development and distribution of the short bigeye *Psuedopriacanthus altus* (Gill) in the western North Atlantic. Fish. Bull. 62:102-149.
- Caldwell, D. K. 1962b. Western Atlantic fishes of the family Priacanthidae. Copeia 1962:417-424.
- Johnson, G. D. 1984. Percoidei: development and relationships. Pages 464-498 in H. G. Moser, W. J. Richards, D. M. Cohen, M. P. Fahay, A. W. Kendall, Jr. and S. L. Richardson, eds. Ontogeny and systematics of fishes. Am. Soc. Ichthyol. Herpetol. Spec. Publ. 1.
- Keene, M. J. and K. A. Tighe. 1984. Beryciformes: development and relationships. Pages 383-392 in H. G. Moser, W. J. Richards, D. M. Cohen, M. P. Fahay, A. W. Kendall, Jr. and S. L. Richardson, eds. Ontogeny and systematics of fishes. Am. Soc. Ichthyol. Herpetol. Spec. Publ. 1.
- Kinoshita, I. 1988. Priacanthidae. Pages 425-431 in M. Okiyama, ed. An atlas of the early stage fishes in Japan. Tokai Univ. Press, Tokyo [in Japanese].
- Powell, A. B. And R. E. Robbins. 1998. Ichthyoplankton adjacent to live-bottom habitats in Onslow Bay, North Carolina. NOAA Technical Report NMFS 133, 32p.
- Robins, C. R. and G. C. Ray. 1986. A field guide to Atlantic coast fishes of North America. Houghton Mifflin, Boston, MA, 354 p.
- Starnes, W. C. 1988. Revision, phylogeny and biogeographic comments on the circumtropical marine percoid fish family Priacanthidae. Bull. Mar. Sci. 43:117-203.
- Watson, W. 1996. Priacanthidae: catalufas, bigeyes. Pages 900-903 in H. G. Moser ed. The early stages of fishes in the California Current region. Calif. Coop. Ocean. Fish. Invest., Atlas No. 33.

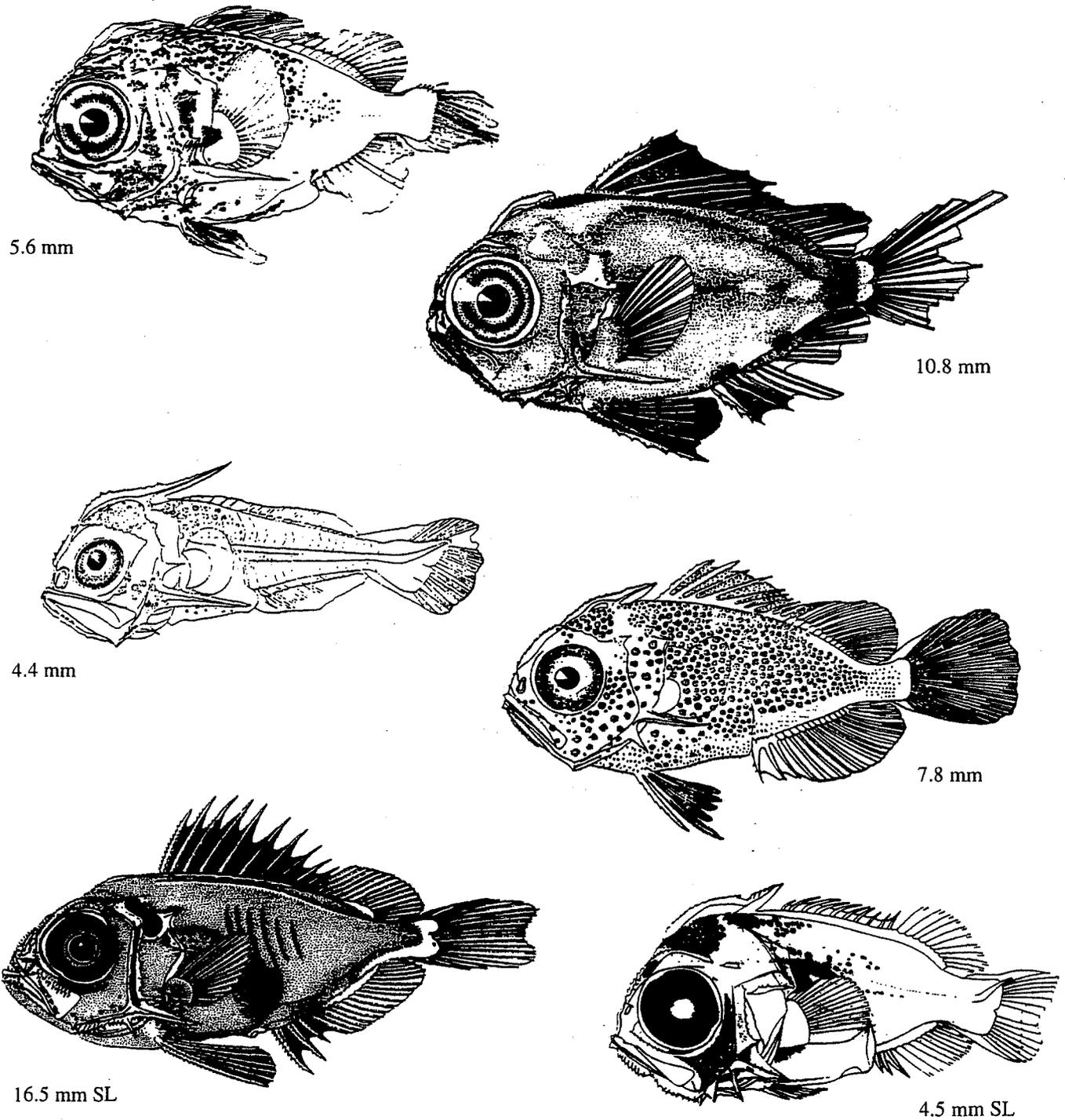


Figure Priacanthidae 1. *Cookeolus japonicus* (top) postflexion larvae, 5.6mm, 10.8 mm: *Heteropriacanthus cruentatus* (middle) flexion larvae, 4.4mm and postflexion larvae, 7.8 mm (Kinoshita, 1988; in Watson, 1996); *Priacanthus arenatus* (bottom) postflexion larvae, 16.5 mm (original illustration by C. Ulanoff); *Pristigenys alta* postflexion larvae, 4.3 mm (original illustration by J. Javech)